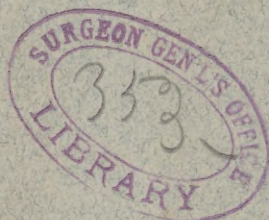


WADDEL, (Thos.)

MATERNAL IMPRESSIONS.

*Report of the Obstetric Section of the
Toledo Medical Association.*



BY

THOS. WADDEL, M. D.

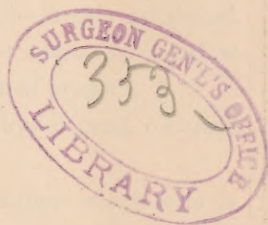
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MR. PRESIDENT AND GENTLEMEN—Your committee, to which the subject of maternal impressions was referred, desire to state as preface to their report, that the question is one which cannot be decided by superficial or hasty examination, involving, as it does, the whole subject of normal as well as abnormal embryonic development, with its general physiology and fact. Besides, it is a question on which authorities are not all agreed, and characterized by a dearth of scientific literature accessible to the English student. If we except the able monograph of Dr. Fisher, on the Genesis of Double Monsters,* no distinct scientific treatise exists in the English language. A few articles in medical journals and reports of societies, with appended cases illustrating some single part of the subject, constitute the bulk of the literature.

Indeed, it has been strongly impressed upon your committee, that to this scantiness of the literature might be largely attributed the want of unity of opinion among the profession. In view of the extent of the question at issue, it has seemed proper :

First, To examine the anatomical and physiological relations of the mother to the embryo.

Second, To consider the facts and circumstances which seem to show that the mother's mind has such power over the fœtus in utero as to change its conformation or cause deformity.

*Transactions of the Medical Society of the State of New York.

Third, To examine such evidence in the light of modern embryonic physiology and pathological anatomy. In doing this it may be necessary in places to apparently step beyond the pale of the subject proper, but remembering that a just appreciation of the question can only be gained by an examination from all available points, we trust to being excused for such apparent digression.

PHYSIOLOGY AND ANATOMY.

It will be remembered that as soon as fecundation of the ovum has taken place, either on the ovary or in the fallopian tube, the uterus prepares a nest for its reception by a hyperplastic development of its lining membrane. When the impregnated ovum reaches the uterus, it falls from the opening of the fallopian tube into a fold or reduplication of the mucous membrane, and soon becomes attached there, and encapsuled by the membrane rising up on all sides and completely enclosing it, thus forming the decidua reflexa (Whittaker). As early as the second week the villi of the chorion are formed, their office being the absorption of the "uterine milk," which is secreted by the maternal cells for the nourishment of the embryo. These villousities of the chorion do not, as "was formerly supposed, penetrate the glandular ostia, and enter the ducts of the glands themselves, thus forming a comparatively firm connection between the ovum and surrounding uterine membranes, but the villi of the chorion are forced, as it were, into the tissue of the reflexa, and are enveloped by it."—*Engleman, on the Mucous Membrane of the Uterus.*

For the first month of pregnancy the attachment between the outer membrane of the ovum (chorion) and its enveloping membranes of the uterus is so slight, "that unless the greatest care is taken, the simple handling of the organ will liberate it," and it is only as late as the third month, when the chorion villi have become developed and enfolded by the decidua serotina, that agglutination of the chorion and decidua finally obtains. About the middle of the third month, two-thirds of the chorion villi have

become atrophied, and the remaining third becoming hypertrophied, are forming the foetal placenta.

We have seen that the embryo has up to this time been sustained by nutritious material furnished by the uterine glands, and absorbed by the chorion villi. This simple means of nutrition now becomes insufficient, and provision is made for a more elaborate supply. This is accomplished by part of the chorion villi becoming enormously enlarged and developed into the foetal portion of the placenta, and being enfolded by the corresponding portion of the membrane of the uterus, bathe constantly in a stream of blood in the sinuses of the maternal placenta.

No interchange of blood occurs at any time between the foetus and the mother. "The vessels of the mother never anastomose, nor do they come in immediate contact with those of the foetal placenta" (Ercolani), only the materials necessary for foetal existence being imbibed and excrementitious material discharged through the membrane forming the walls of the villi.

Some authorities, as Ercolani (*Memoir on the Utricular Glands of the Uterus*), assert that even this interchange is not a simple osmotic process, but that the outer walls of the villi are composed of secreting cells, which abstract from the blood by which it is bathed the nutrient materials (uterine milk) which nourish the foetus.

"No nerves or lymphatics exist in either portion of the placenta. The cord contains no nerves, no capillaries, not even vasa vasorum, and no lymphatics."—*Whittaker, Morbid Anatomy of the Placenta.*

Simpson says: "Nor has any anatomist ever traced the passage of any nervous branches from the applied surface of the uterus, nor have any nutrient arteries been as yet at least shown to pass from the uterus into the maternal substance of the placenta."—*Type of Structure of the Placenta.*

Says Meadows: "All attempts to discover any nervous connection between the foetus and the mother have hitherto entirely failed. No one has yet ventured to affirm the existence of nerve

structure in the umbilical cord, nor has a trace been discovered in the placenta itself.”—*Manual of Midwifery*.

The evidence of maternal impressions being conveyed to the foetus in utero and causing its deformity is found in cases reported, such as the following, the first two from Dr. William Hammond:

“A lady in the third month of pregnancy was very much horrified by her husband being brought home one evening with a severe wound of the face, from which the blood was streaming. The shock to her was so great that she fainted and subsequently had an hysterical attack, during which she was under my care. Soon after her recovery she told me that she was afraid her child would be afflicted in some way, and even then could not get rid of the impression the sight of her husband’s bloody face had made on her. In due time the child, a girl, was born. She had a dark, red mark upon her face, corresponding in situation and extent with that which had been upon her father’s face. She proved, also, to be idiotic.”

The wife of the janitor of the College of Physicians and Surgeons, during her pregnancy, dreamed that she saw a man who had lost a part of the external ear. The dream made a great impression on her mind, and she mentioned it to her husband. When her child was born, a portion of one ear was deficient, and the organ was exactly like the defective ear she had seen in her dream. * * * I have examined this child, and the ear looks as if a portion had been cut off with a sharp knife.—*William A. Hammond, in the Psychological Journal, Vol. 2, 1868.*

At a meeting of the Philadelphia Obstetrical Society, the following cases were reported as well authenticated:

Dr. Ludlow said that in one case the mother daily passed a child whose limbs were bandaged for white swelling. Her child was born with every limb dislocated. Another mother was frightened by a hideous face; her child was born with a hare lip. In another case the mother placed her hand on her face on the occasion of a fire. The child was born with a red fire mark on the face.

Dr. Taylor had seen a case in a child whose right hand was without fingers. The mother accounted for it by the fact that

early in gestation a beggar asked her for alms, at the same time thrusting out a mutilated hand. Dr. Stewart had a case where the mother asked immediately whether the child was well formed about the hand; each had a supernumerary finger. The mother had been impressed by seeing a man pass the house with those supernumerary fingers."—*American Journal of Obstetrics*, Vol. 6, p. 641.

A woman between four and five months advanced in pregnancy had an insatiable desire for a fine salmon which she saw in the market. This she purchased despite her poverty, and as a result, at the end of the full term of normal gestation, she was delivered of a child, the head and body of which presented a peculiar and strange conformation; in truth, it was salmon-shaped; while the fingers and toes were webbed, representing the fins and tail of a salmon.—*Dr. Horsefield, Fellow of the New York Academy of Medicine. Dr. Orilley quoted by Fisher.*

Prof. Carnochan, of New York, wrote to Dr. Orilley, in 1864, giving him an account of two cases of hare lip, which he says "I have no doubt occurred from maternal impressions conveyed to the fœtus"—one, he states, caused by a dentist, who roughly lifted the mother's upper lip at the sixth month of pregnancy; the other by a female, then pregnant eight weeks, seeing two girls suddenly enter a room, who had each been imperfectly relieved by surgery for this deformity. Prof. C. adds: "I could proceed enumerating cases of a similar character proving, as I believe, the positive influence of maternal impressions upon the fœtus *in utero*."

The author from whom the first two cases are quoted is an able and earnest advocate of the affirmative side of this question. Hence we believe they present as good evidence as circumstances can well furnish. Referring to the first, Dr. Hammond says: "This case, which occurred in my own experience, scarcely admits of doubt as to the influence of the maternal mind over the physical structure of the fœtus." And again: "The chances of these instances and others which I have mentioned being due to coincidence are infinitesimally small, and though I am careful not to reason *post hoc*, I cannot, nor do I think any other person can, no

matter how logical may be his mind, reason fairly against the connection between cause and effect in such cases. The correctness of the facts can only be questioned; if these be accepted, the probabilities are thousands of millions to one that the relations between the phenomena are direct." The means by which such effects are produced he assumes to be the blood, which in some way carries the influence of the existing condition of the mother to the foetus by the interchange of the circulation. He considers it to be analogous to the phenomena by which fear, passion and anger have been known (?) to cause the nursing mother's milk to become suddenly fatal to the child.

Dr. Dalton says: "It is through the medium of the placental circulation that those disturbing effects are produced on the nutrition of the foetus which result from sudden shocks or injuries inflicted upon the mother. There is now little room for doubt that various deformities and deficiencies of the foetus, conformably to the popular belief, do really originate, in certain cases, from nervous impressions, such as disgust, fear or anger, experienced by the mother. The mode in which these effects may be produced is readily understood from what has been said above on the anatomy and functions of the placenta.

"We know very well how easily nervous impressions will disturb the circulation in the brain, the face, the lungs, etc., and the uterine circulation is quite as easily influenced by similar causes, as physicians see every day in cases of amenorrhea, menorrhagia, etc. If a nervous shock may excite premature contraction in the muscular fibres of the pregnant uterus, and produce abortion, as not unfrequently happens, it is certainly capable of disturbing the course of the circulation through the same organ.

"But the foetal circulation is dependent, to a great extent, on the maternal, since the two sets of vessels are so closely entwined in the placenta, and since the foetal blood has much the same relation to the maternal that the blood in the pulmonary capillaries has to the air vesicles, it will be liable to derangement for similar causes. * * * Whatever arrests or disturbs the circulation through the vessels of the maternal uterus must necessarily be liable to interfere with that in the foetal capillaries forming part

of the placenta. And lastly, as the nutrition of the fetus is provided for wholly by the placenta, it will, of course, suffer immediately from any such disturbance of the placental circulation. These effects may be manifested either in the general atrophy and death of the fetus, or, if the disturbing cause is slight, in the atrophy or imperfect development of particular parts; just as in the adult a morbid cause, operating through the entire system, may be first, or even exclusively, manifested in some particular organ which is more sensitive to its influence than other parts."—*Human Physiology, 4th edition, page 617.*

Says Dr. Seguin: "Impressions will sometimes reach the fetus in its recess, cut off its legs or arms, or inflict large flesh wounds, before birth—inexplicable as well as indisputable facts."—*Idiocy and Its Treatment.*

Your committee would not consider it proper to accept these histories and statements as conclusive, but desire to examine them in the light of demonstrated modern physiological truth. Hence the necessity of reviewing at some length some of the proved facts pertaining to embryonic development.

From the earliest periods of history until the present, the possibility of the mother's mind impressing the fetus *in utero* was a settled belief of the laity of all classes. As an example of how deeply rooted are such convictions, it is well known that during the past thirty years the French government refused to grant permission to exhibit living double monstrosities within the empire, for fear that pregnant women beholding them would bring forth similar abnormalities.

Nor is this belief confined alone to the laity, for medical men from the time of Hippocrates, five centuries before Christ, to that of Ambrose Pare, in the eighteenth century, A. D., had full faith in the power of the mother's mind to produce deformity of the fetus.

We cannot wonder at this when we consider that embryology as a science hardly existed up to the middle of the eighteenth century, and consequently no advances had been made looking to their etiology on an anatomical and embryological basis—the only

method by which the relations of abnormal to normal development can be profitably studied.

Although Morgagni and his cotemporaries had corrected many erroneous doctrines, and proposed more rational explanations regarding the nature and origin of abnormal formations, the distinguished honor of elevating the subject to a science is due to the genius of Albrecht Von Haller, who expunged from its literature the superstitious ideas and non-authenticated cases which were relics of the fabulous period from which it had only emerged.

In this condition it remained to the time of Bichat, who, says Dr. Fisher, was the founder of philosophical and analytical anatomy. "The maturely and normally developed human body was compared with the embryo. The various species of organized beings and their embryo were compared with man, and as a result, we became acquainted, on the one hand, with the ultimate structure, composition and science of the human body, and, on the other, with the general facts, plan and unity of animal organization, including all its multiform genera and species in every age. On these comprehensive views a new theory of anomalies and monstrosities was founded, viz: that of arrest and retardation of development, which is now found to explain many varieties of monstrosities, but more particularly those which should be regarded as vices of conformation, as, for example, cleft formations, deficiencies, absence of parts, etc. By a careful study of the laws of development, and the order in which the various organs are evolved in the embryo, it has been observed that monsters by defect or arrest of development are, to a certain extent, permanent embryos. The abnormal organs merely represent the primitive condition of formation as it existed at an early stage of embryonic or foetal life.—*An essay on Compound Human Monsters—Trans. New York State Medical Society, 1865, p. 248.*

ARREST OF DEVELOPMENT.

This class of malformations is so common, and one of so much importance in the study of this subject, that we have thought proper to append the following cases, with a view to illustrating their etiology:

Case of Dr. Roberts—Child a female, seventh month; acephalous; the entire scalp, the integuments over the spinal column, with the lamina and spinous processes of the cervical and dorsal vertebra, were wanting; abdominal parietes also wanting, exposing the liver in situ, covered only by peritoneum; several coils of intestine extruded.—*Trans. Obstetrical Society of London, 1869.*

Case of Dr. Gretchell.—Mother aged nineteen; first birth; child born alive, lived half an hour; “besides having club feet and spina bifida, it had all the abdominal organs outside the abdomen, covered only by serous membrane. There was neither anus nor genital organs. The mother could assign no cause; she expected a healthy child.”

Case of Dr. May.—Subject was aged twenty-eight; had exstrophy of the bladder; tumor large as two fists; orifices of ureters visible; penis short, flattened and imperforate; no signs of an umbilicus or previous attachment of fetal cord; perfectly deaf in one ear; had six toes on each foot; is second of a family of nine children; the fifth had a small toe hanging from his great toe.”—*Am. Jour. Med. Sciences, July, 1869.*

To properly consider these, as well as all similar cases, it is necessary for us to refer to the normal development of the embryo. The dorsal plates, which afterwards form the spinal column, are developed on the surface of the external blastodermic membrane as two elevated ridges enclosing a furrow. These ridges, gradually rising and approaching each other, unite to form the spinal column. If, from failure of the formative force, these plates do not develop sufficiently to unite and close the canal, spina bifida is the result.

In the same manner the abdominal plates, arising from these dorsal plates, by extending outwards and forwards meet together at the umbilicus, and thus form the parietes of the abdomen. Arrest of development affecting these plates does not necessarily interfere with the evolution of the abdominal viscera, hence the liver, spleen, kidneys, bladder and alimentary canal often attain their normal development and position, but from failure of development of the abdominal plates, they remain uncovered save by peritoneum. The resulting deformity is not infrequently attrib-

uted to the mothers having contemplated the specimens of butcher shops, when in reality it often has its origin in purely local causes, such as adhesions of the amnion or "shortness of the penis and deficient union of the vessels forming into one common cord."—*Vogel*.

The arrested development of the maxillary processes causes hare lip. The bony structures may unite, leaving the soft parts separated (simple hare lip), or arrested development of the entire structures may obtain (cleft palate—complicated hare lip). Acephalous fœtus, a very common form of malformation, is now known to result from embryonic hydrocephalus, the cerebral vesicles becoming distended until rupture takes place. The sides and vault of the cranium, as well as the cerebral matter, are consequently not formed.

But what is most interesting in this connection is the fact pointed out by Dr. Burtell, viz: "That in whatever way a simple hare lip has been formed, it seems to be still capable of secondary cicatrization *in utero*. The proximal edges of the hare lip being in contact, the epithelium may give way, and the two raw surfaces unite by cicatrization."

Another point to which we would call particular attention is, that "if the emotions of the mother ever affect the fœtus so as to induce deformity, this must be done at or before the precise time at which the deformed part is undergoing evolution." Thus we well know that as early as the third month the hands and feet are formed, and by the fourteenth week the abdominal plates have united at the umbilicus; the genital organs are distinct, and the maxillary processes, with their soft parts, have united, forming the upper lip. And yet in one of the cases of hare lip of Prof. Carnochan, previously quoted, the deformity is gravely attributed to a dentist roughly handling the mother's lip *during the sixth month of pregnancy*, which would necessitate, not a power to arrest development, but a power to actually destroy parts already developed.

In like manner, it is not uncommon for cases of exstrophy of the bladder, ectopia viscera, etc., to be cited as examples of some impression made on the mother's mind as late as the fourth, fifth

or even the sixth month, when, in fact, it is now positively determined that the causes of this deformity, viz: adhesions of the allantois to the chorion, must be operative as early as the fourth week.—*Mr. John Wood, Half-Yearly Abstract, July 1869.*

It is an interesting fact connected with arrested development that this tendency frequently descends through generations. Thus, of eleven cases of hare lip quoted by Dr. Fisher, two were hereditary. In the one case three children of one family, and in the other two maternal uncles, had a like deformity. Dr. Gordon Buck saw a woman in his clinic at St. Luke's Hospital who was the mother of seven healthy children, six of whom had hare lip. The mother, as well as her brother and sister, were similarly deformed.—*Medical Record, vol. 6, p. 505.*

Dr. Pooley reports the case of a little girl ten years of age, who had deficiency of both upper extremities; thumbs of each hand, with the corresponding carpal bones, absent; both forearms abnormally shortened, with total absence of the radius of the left; ears small and abnormally shaped; slightly deaf; child very bright and intelligent, but has well marked phthisis. The mother has a similar deformity; she is also a victim of phthisis. Had another child similarly deformed; had two other children which were normal in every way. It might be mentioned, in this connection, that the grandmother of this little girl attributes the deformity of the mother to "fright while pregnant from some crabs crawling on the kitchen floor." She also attributes the deformity of the grandchildren to a fright which the mother received while pregnant.—*Am. Jour. Med. Sciences, Oct., 1867, p. 410.*

Case of Dr. John Harker.—The boy's fingers were webbed to the tips, the little finger having an extra nail, "each member thus forming a prehensile paw." The child's father and grandfather had similar hands. The child is very active and intelligent. The little toe of the right foot is webbed to the next toe; some (not all) of the brothers and sisters had similar hands.—*Lancet, 1866.*

Among the causes of arrested development which deserve prominent mention, stand great constitutional debility, or inherited diathesis of either or both parents. The operation of these causes are well illustrated by the following cases:

Case of Dr. Michael.—The mother's father had a very nervous temperament, she herself having chorea from infancy, periodically. She had seven miscarriages in succession at periods more and more advanced. Those children were well formed. The eighth child, a female, she carried to full term. It was beautifully formed in every way, but was found totally blind from congenital amaurosis. The reporter says: "Here the super-excitation of the nervous system of the mother produced no effect whatever on the development of the child, whose eyes were well formed, but the nervous disease with which the parent suffered presented itself in the offspring in the modified form of retinal insensibility.—*Amer. Jour. Med. Sciences.*

Case of Dr. Parish.—Father aged forty-five; in the last stages of consumption; mother had six children, all healthy. She herself is feeble, but not diseased. The abdomen was large; an unusually large quantity of liquor amnii escaped. The child was well developed in all parts except the head; the bony structures of the cranial vault were absent.—*Am. Jour. of Obstetrics, vol. 8, p. 546.*

While engaged in the preparation of this report, the following interesting case, showing the influence of diathesis, came under the observation of your committee: Father aged twenty-three; mother aged twenty; both healthy; first birth; child presented by the breach, yet labor was easy. On examination, the child was found to have double talipes varus, the right foot being badly deformed, the left less so. The sacrum was bifid, the projecting tumor only moderately large, and partially covered by integument, the remaining covering being the attenuated membrane of the cord. On casual inquiry, no evidence of immediate congenital deformity in either branch of the family could be elicited, but on directing attention of the parents to that point, the following pathological history was brought to light: One paternal uncle on grandmother's side had double club feet; one paternal aunt, herself healthy, gave birth to two children with hare lip; one paternal niece died from non-congenital kyphosis; another paternal niece was born with deficiency of the cranial vault; the grandfather had, at the time of his death, a small tumor on his spine, caused by a slight injury.

Sir James Y. Simpson described, in 1838, intra-uterine peritonitis as a "most common form of fetal disease," and reported nine cases occurring in his practice during twenty-two months. He found the disease in one case as early as the fourth month. Having so frequently observed patches of coagulable lymph on the surface of the peritoneum in cases of monstrosity, characterized by extroversion of the viscera, he was led to believe that the occurrence of peritonitis and other inflammations affecting the embryo at a very early period, was a common cause of malformations.—*Obstet. and Gynæcology*, p. 119.

Bronchocele, another disease affecting the fetus *in utero*, sometimes causes marked deformity, as instance the specimen presented to this association by Dr. Reid, in which, from the pressure of the tumor, the head was thrown backwards (probably as early as the sixth week of intra-uterine life). The occiput resting against the spinal column, union obtained, and a direct opening from the posterior occipital region to the dorsal region of the spinal canal.

An interesting fact bearing on this subject of intra-uterine fetal disease as causative of congenital deformities, has been presented by Dr. St. John Roosa: From a careful examination of the membrum tympani, throat and fauces of two hundred and sixty-nine deaf mutes, he found in one hundred and eleven of the one hundred and eighteen cases classified as congenital, a pharyngitis and tonsillitis. From the constant occurrence of this complication, and the well known intimate connection between the faucial mucous membrane and the middle ear, he reaches the conclusion that "by far the greater number of cases of congenital deaf mutism, as here observed, had their origin in inflammation of the middle ear occurring in intra-uterine life."—*Am. Jour. Medical Sciences*, April, 1867.

So much for arrested development and its causes. But "the process of evolution may be excessive, as well as incomplete. When excessive in certain portions of the capillaries, these blood vessels, which are, in the normal state, too small to be seen by the naked eye, now become so large as to carry red blood, and to impart to the locality (if in the skin) a corresponding degree of

redness. This is the way marks are formed. An excess of evolution may also produce supernumerary fingers or other appendages."—*Dugas, quoted by Fisher.*

It is this excessive development of blood vessels which are constantly pointed out as marks of fruits, etc., for which the mother longed, or the representation of some animal or object which frightened her during pregnancy.

Dr. Detmold, during a discussion before the New York Academy of Medicine upon this subject, remarked: "I suppose there is hardly a surgeon who has not seen a large number of cases where deformities have been attributed to influences of the same kind. I allude to those red spots—those aneurisms by anastomoses—which are attributed by the mothers of the children to this and to that cause. I recollect fifteen years ago I was called on by a distinguished obstetrician to perform an operation on a child's cheek. He told me that the mother had been frightened by a leech, and that of course the child had a leech on the cheek. It was simply an aneurism by anastomoses, with as much resemblance to a leech as to an elephant."—*Bulletin N. Y. Academy of Medicine, vol. 1, p. 364.*

A fact in connection with this class of deformities (moles, nevi, supernumerary fingers and toes, etc.) has been frequently attested, viz: that they are, in common with family resemblances, most frequently transmitted through generations.

INTRA-UTERINE AMPUTATIONS.

Few congenital deformities found affecting the fœtus are so often pointed out as the result of maternal impressions as deficiency of limbs or intra-uterine amputations. For a noted example of this, we have only to refer to the remark of Dr. Seguin, before quoted, viz: "that such impressions will reach the fœtus in its recess, cut off its arms or legs," and he boldly asserts them as "inexplicable as well as indisputable facts."

Your committee believe that nearly if not all of the varieties of this deformity can be positively shown to depend on disease of the membranes enclosing the fœtus or its appendages.

Dr. Montgomery, in his admirable essay on spontaneous ampu-

tation, first showed the possibility of these amputations being due to amniotic bands, and reported a series of twenty-eight cases illustrating nearly all the varieties of this deformity. He believed that in most of these cases inflammatory action obtains in the membranes, resulting in adhesions to the skin of the fœtus by means of organized lymph.

Schreder concurs in this opinion, and believes that delay in the secretion of the liquor amnii predisposes to the formation of such adhesions.

Prof. Gurlt explains their *modus operandi* by supposing that the liquor when secreted separates the fœtus and the membranes. The struggles of the fœtus, together with the contraction of the organized lymph, increases the pressure on the parts encircled by the bands, and results in amputation.

Courty says: "The pseudo membranes found on the internal surface of and firmly adherent to the amnion, are probable traces of a peculiar inflammation of the amnios. When these phenomena occur early, the amniotic fluid may be absorbed and adhesions established between the integument of the fœtus and the membranes, and these adhesions become in time the cause of various monstrosities."—*Whittaker, Morbid Anatomy of the Placenta.*

The result of these adhesions have been shown to be materially modified according to the period of intra-uterine life when applied. Thus, according to Dr. McCann, if applied early in fœtal life, you will find the limb most probably wholly amputated and the stump quite healed. If somewhat later, you may still find the limb amputated, but the stump will present a small portion of its surface still unhealed, which is always found to be the end of the bones. If the ligature be applied still later, you may find nothing but a furrow or indentation of the limb.—*Obstetrical Journal Great Britain and Ireland, February, 1875.*

Again, if amputation occurs early, there is every reason to believe that the amputated limb may be absorbed, for in cases occurring towards the last of pregnancy, the limb is most generally found enclosed in the membranes, whereas, the limb can rarely, if ever, be found in those cases of early amputations. Facts prove conclusively that in those latter cases not only the

limb but also the false bands which caused the amputation may be completely absorbed, so that a careful examination of the secundines at the time of normal delivery may fail to reveal the causes of the deformity.

Your committee have not accepted these doctrines without, as seems to them, good reasons for their faith. Accordingly they have subjoined a few cases illustrating this point :

Case of Dr. Kidd.—"Child born in the Comb Lying-in Hospital. One leg was amputated midway between the ankle and the knee. I was not present at the birth, but when I paid my morning visit, succeeded in getting the membranes, and searching carefully in them found the amputated extremity. The other leg was partially amputated, and there was no evidence how the amputation had taken place. In the one hand a fine band passed from the top of the index finger, partially enclosing the middle finger, and attached it to the ring finger. It had nearly cut off the top of the middle finger, and some of the fingers of the other hand had the same kind of bands attached to them."—*Obstetrical Journal Great Britain and Ireland, Vol. 2, p. 737.*

In the remarks made on this case before the Obstetrical Society of Dublin, Dr. Kidd stated that "there was two months difference in development between the child and the foot; the former was full nine months."

Case of Dr. Jacobi.—"A full grown child, born at term; both hands are flexed. On the right side the thumb portions of the carpus and the radius are absent. The forearm is unusually short. On the left side the fingers are adherent, and the third and fourth phalanges of the second and third fingers are constricted and almost amputated. On the left leg there is a sharp constriction of the calf, about half way between the knee and the ankle. Several toes on both feet are adherent, and on the right foot the third toe is strongly constricted by a band going from the second to the fourth toe. All these bands are of amniotic origin."—*American Journal of Obstetrics, Vol. 7, p. 147.*

At a meeting of the Obstetrical Society of New York, Dr. Paul Munde stated that "he had seen a case of partial spontaneous amputation of the metacarpus and first phalanx of the second and

third fingers, in which the cause of the amputation was an amniotic band, as proved by the presence of a portion of the constricting band in the palm of the hand in a line directly continuous with the furrow on the sides and back of the hand."—*American Journal Obstetrics*, Vol. 8, p. 544.

Dr. O. Mason exhibited to the Obstetrical Society of New York a fetal thumb, and gave the following history: "At the birth of the child he noticed that the thumb was very large from œdema, and that it was attached at the metacarpo-phalangeal articulation by a mere thread of skin."

These cases, your committee think, clearly establish the fact that these bands are frequently the cause of the amputation.

The most frequent site for the occurrence of such adhesions is undoubtedly that portion of the amniotic membrane reflected over the placenta and cord. This might be inferred for various anatomical and physiological reasons. During the evolution of the cavity of the amnion and closure of the abdominal plates, conditions exist which may, under slight influences, result in the most grievous deformities. The following cases quoted from Whittaker are not without interest in this connection:

Case of Montgomery.—"Breach presentation; body expelled to the axilla and then immovable; after a while a violent pain expelled the body, head and secundines in toto. The cause of the resistance was now manifest; from the upper part of the funis umbilicalis, the circulation of which was not at all impeded, passed a very strong band about one and a half inches long, with its end firmly attached to the surface of the placenta. This band was perforated, and in the aperture the arm was grasped so tightly just below the elbow that the soft parts were drawn in as if by gradual impression, and covered by skin were divided down to the bone."

Another instance is given of total absence of the entire right lower extremity and part of the pelvis, with cohesion of the placenta with the body of the child at the perineal region, where it still remained adherent.

Braun exhibited two specimens from the Vienna Lying-in Hospital. In the one case the amnion was firmly adherent to the

dura-mater. False bands from the placenta had amputated three fingers of the right hand ; the toes were united. In the other the placenta was attached to the umbilicus, which the process of expulsion tore open, exposing the abdominal contents.

In 1856, M. Rayer presented to the Society of Biology, of Paris, a hyperencephalic monster, with adhesion of the placenta to the cerebral envelopes.

Carpentear mentions other almost similar cases in the Museum Dupuytren, at Paris. According to Houel, the placenta adheres to the fœtus in but two parts of its surface, viz., the vault of the cranium and the abdomen ; there exists in either case a hernia of the viscera.

He also states that hernia of the brain or absence of that organ, with adhesions of its envelopes to the placenta, seems to be due to shortness of the cord, which he considers primitive.—*Whittaker, Morbid Anatomy of the Placenta—Am. Obstet. Jour.*

Even the umbilical cord may, by becoming entwined about certain portions of the fœtus, cause amputations, deformity or death. Whittaker, in his admirable essay, quoted above, says : “ That the cord when entwined about the limbs of a child may amputate the limb, is a fact with which we have long been made acquainted by Montgomery, who has reported a number of interesting cases.”

Schwabe has also reported a case of amputation of the leg of an embryo of three months, just above the ankle joint. * * * *
“ Braun thinks this impossible,” but “ Klob pertinently remarks that it is questionable whether even the pulsations of the cord itself might not be sufficient to divide the delicate structures of an embryo at this period.”

At a meeting of the Obstetrical Society of Philadelphia, October 2d, 1873, Dr. Ingraham exhibited a fœtus of four and a half months with the cord wound once around the thigh, making a deep groove in the integument. Had the fœtus lived to maturity it would undoubtedly have been born with a congenital deficiency of the right leg.—*Am. Jour. of Obstetrics, vol. 7, p. 160.*

The following interesting case occurred in the practice of Dr. Chapman, of this city, to whom we are indebted for its report : Mrs. D. was taken in labor prematurely (seventh month), and

after twenty-four hours, was delivered of a dead fœtus, which was immediately followed by a living one of about seven months development. In examining the children, the one born dead was found much smaller than the other, development having ceased some time previously, while in the case of the living fœtus development had been uninterrupted.

“On examination for cause of death, it was discovered that the cord had been wrapped round one limb of the child twice, once around the leg and once around the thigh. The leg and thigh were nearly severed from the body, the bone being the only portion undivided.”

Your committee have thought proper to dwell at this length on these demonstrable causes of deformity, believing that they have an important bearing on the question at issue, for unless we can find that the impressions of the mother's mind do in some way bring about these pathological states just alluded to, we must reasonably exclude their influence in the causation of a large class of deformities, such as intra-uterine amputations, some cases of arrested development, distortion of limbs, talipes, hernia of the abdominal viscera, etc.

Regarding the real cause of amniotic bands, enough has been observed to lead strongly to the belief that certain diseases of the uterus or its membranes, or traumatic influences, may in most cases sufficiently account for their production.

We have only time, in passing, to call attention to the great field open for fruitful research, in certain departments of uterine pathology in its relations to this question. Particularly is this so as regards the influences of inflammation existing previous to conception. This subject, which is now attracting the attention of pathologists to its influence in causing abortion and morbid conditions of the placenta and membranes, cannot but yield rich returns when investigated with reference to the pathology of fœtal life.

The remarks of Dr. Robert Barnes, when speaking of placental adhesions, would probably be equally pertinent if applied to this subject. He says: “That in true placental adhesions there is organic change of structure, or abnormal deposit in the decidua

portion of that organ, beginning, in all probability, in the mucous membrane before pregnancy. * * * The maternal origin of the forms of diseased placenta leading to adhesion is proved often by the history of previous endometritis or other disease, and by the frequent recurrence of adherent placenta in successive pregnancies.”—*Obstetric Operations*.

Braun “finds a cause of hydrometra gravidi uteri in the fluid poured out by this inflammatory process, or by an existing endometritis serosa.”—*Whittaker*.

The two following cases are interesting, as tending to add force to the foregoing remarks. The first, reported by Dr. Kidd, of Dublin, is confirmatory of the influence of inflammatory disease of the uterus in causing deformity of the fœtus :

“A woman who was a considerable time in the hospital as a patient, during pregnancy, for chronic inflammatory tumor in connection with the uterus—a localized peritonitis. After she recovered and left the hospital she came back for her confinement. *Her child had two arms amputated and one leg.*”—*Obstet. Jour. Great Britain and Ireland*, vol. 2, p. 728.

The second case, reported by Dr. Charles Leale, shows the influence of an injury to the mother’s abdomen, the traumatism producing disease of the fœtus, which, in turn, reacting on structures not intimately connected with the seat of disease, may produce grave deformity of distant organs.

Mrs. A., a very healthy woman; age, thirty-three; had four previous labors, in which the children were perfect. Had good health with this child until the seventh month. About this time she received a severe contusion on the abdomen, from which she fainted, and had to be carried to her home. From this time forward the movements of the fœtus were much less vigorous. She was delivered at full term of a male of eight and one-half pounds, which lived one hour. Post mortem revealed meningeal apoplexy, and, as a consequence, general paralysis, talipes calcaneus of both feet, dislocation of both hands and feet existing at birth.—*Amer. Jour. Med. Sciences*, July, 1870,

DOUBLE MONSTERS AND TWINS.

We would next call attention to the laws governing the development of so-called double monsters, and their relations to twins.

It is a fact now determined by repeated observation, that when twins have a common chorion, there is always unity of sex. Also, that where twins have a common placenta or anastomoses of the placental vessels, there is always unity of sex. With regard to this point Dr. Whittaker says: "The reason that two chorions are present in some cases and but one in others is referred to the origin of the ova. If both ova are from different graafian follicles, each will possess its own chorion and amnion; if both germs exist in the same ovum, there can be but one common chorion."

In every case of double monster or joined fœtus, there is unity of sex. This form of malformation occurs once in twenty million of births, and yet in five hundred cases accurately reported, no single exception to this rule is known.

Dr. Fisher says, in regard to the genesis of double monsters, "that they are not the result of an accidental coalition of twins at some uncertain period of their embryonic development, neither do they result from a double egg, that is to say, an egg containing two yolks enclosed in one capsule. They are invariably the product of a single ovum, with a single vitellus and vittelline membrane, upon which a double cicatricula or two primitive traces are developed. The several forms of double malformation, the degree of duplicity, the character and the extent of the fusion—all result from the proximity and relative positions of the neural axis of two more or less complete primitive traces developed on the vitelline membrane of a single ovum. This is not a theoretical opinion; it is an established fact, determined by direct and repeated observation and research, instituted by different embryologists. It furnishes a satisfactory explanation of the several laws which have been discovered to preside over the development of double monsters, viz., the law of homologous union, the law of unity of sex, and the less certainly determined law of transposition of viscera. Homologous union and unity of sex in duplex formations are positive laws."

Hence we see that normal twins with common chorion, and double monster have a like origin, viz., the development of a double cicatrix on the blastodermic membrane of a single ovum, so that the question whether the result of the impregnation of such an ovum shall be normal twins or double monster depends on the nearness of the primitive traces to each other.

But there is yet an interesting fact connected with the genesis of twins, which it is proper here to note, viz., that when there is an anastomosis of the placental vessels, this anatomical condition itself is often the direct cause of grave foetal deformity. Acardia, or monsters without a heart, are thus produced. A free anastomosis existing between the veins of each placenta, when the heart's action of the foetus becomes established, if the action of each foetal heart be equal in force, a thrombus of the anastomosing vessels obtains. But if, as often happens, the heart's forces are not balanced, the stronger blood current in the placenta will push back the weaker one, at first impeding the circulation of the less favored foetus, then arresting it, and finally causing it to take an inverse direction. "As a result, the heart then atrophies, and the body of the foetus becomes a simple appendage to the healthy one, the circulation in this now deformed foetus depending entirely on the heart of the healthy foetus driving the blood through the placental anastomoses. Such a force being entirely inadequate to drive the blood through the upper portion of the body of the acardia, arrested development obtains, while the favorable position of the lower extremities for receiving blood explains their further though imperfect growth."—*William T. Lusk, M. D., New York Medical Journal, February, 1874.*

EXPERIMENTAL EMBRYOLOGY.

It would be doing injustice to this subject were we to close this already too extended review without mention of the valuable contributions which experimental embryology has made to its elucidation.

Geoffry St. Hilaire first showed the possibility of the production of monsters artificially, but it has remained for M. Dareste, by direct experiment, to submit the process of their production to

direct observation, and evolve most of the types of simple monstrosity.

“When eggs are submitted to incubation, the conditions of which differ from those of ordinary incubation, the evolution is disturbed, and there appear anomalies and monstrosities.” M. Dareste has employed four processes to this end :

First, A vertical position of the egg.

Second, Diminution of the porosity of the shell with impermeable coatings.

Third, Contact of the egg with a source of heat near the cicatrice, but not coinciding with it.

Fourth, The production of temperatures slightly above or below that of normal incubation.”—*American Journal Medical Science*, April, 1874.

By the first two changes the evolution is often disturbed—by the last two it always is. And what is most remarkable is that the nature and kind of abnormality can, in some cases, be foreseen, as, for instance, “the heating of the egg at a point near the cicatrice produces always the same result, viz., a much greater development of the blastoderm and of the vascular area between the embryo and the source of heat.” The experimenter thinks that by certain modes of applying heat an inversion of the viscera might be caused. But the fact elicited by these investigations which most strongly throws discredit on the possibility of the mother influencing the form of the foetus in utero is, that M. Dareste states it as one of the most general results obtained, that monsters have always their origin in that period of embryonic life when the embryo is entirely formed of homogeneous blastema. The monstrous organs first appear with all their teretological characters in blastema, which has been previously modified. He has also observed that arrest of development is the general process of the formation of simple monsters. It first acts directly on certain organs, then the change in these organs involves, consequently, a certain number of changes in other organs, changes characterized by arrest of development, fusion of similar parts, changes in position, etc.

These investigations have farther disclosed the fact that in the

formation of abnormalities the amnion plays an important part. Thus the arrest of development of the cephalic hood of the amnion causes cyclopia and various displacements of the head. The arrest of development of the whole of the amnion causes various monstrosities, which are sometimes produced separately, and are sometimes associated, such as eventration, cerebral hernia, deficiencies of limbs, and various incurvations of the spinal column, and deviations.

The influence of the amnion in causing deformities is strikingly shown in the fact that in fishes, although the general types of monstrosity exist exactly as in mammalia, yet, owing to absence of amnion, the class is much less diversified.

From the foregoing review the following facts seem to be well established :

1. That during embryonic existence certain parts may be hindered or arrested in their development, while the other organs not directly connected with them may continue their evolution and become fully developed.

2. That ectropia viscera of the abdomen, spina bifida, cleft palate, hare lip, webbed fingers and toes, etc., are only evidence of arrested development of embryonic abdominal, spinal and maxillary processes, or, in the case of the webbed extremities, the continuation of the embryonic hand or foot of the second month.

3. That any agency causing arrest of development of any portion of the foetus must necessarily operate prior to the evolution of that part.

4. That the cause of arrested development may be local or general: (*a*). Injuries to the mother's abdomen; (*b*). Diseases of the uterus or its membranes; (*c*). Diseased ovum from diathesis of either parent; (*d*). Hereditary transmission of deformity.

5. That excessive development of parts of the foetus may obtain, resulting in nevi, aneurisms by anastomoses, supernumerary fingers, toes, etc.

6. That such peculiarities are, in common with family resemblance, frequently transmitted through generations.

7. That intra-uterine amputations are the result of amniotic

bands, placental adhesions, fracture, or from pressure of a loop of the umbilical cord.

8. That amniotic bands or placental adhesions may result from inflammation of the uterus, its decidua, or inflammatory disease of the foetus.

9. That amputations may be caused by these false membranes, which may be afterwards absorbed, as also the amputated extremity.

10. That so-called double monsters, or foetus *in fetu*, are the result of the development of a double cicatricula on the blastodermic membrane of a single ovum.

11. That twins with a common chorion also result from the development of a double cicatricula on the blastodermic membrane of a single ovum.

12. That in either case there is always unity of sex.

13. That the nearness of the primitive traces to each other determine whether impregnation will result in separate twins or double monster.

14. That in twins with single chorion or anastomosis of the placental vessels, one foetus may become perfectly developed while the other becomes monstrous.

15. That the development of the abnormality in such cases depends on local anatomical causes, and is governed by definite laws.

16. That every known form of malformation in the human race has its analogue in the lower animals, birds, fishes and reptiles.

From the consideration of all these facts the subject is narrowed down to the following questions, viz :

Can the mother's mind so act on the foetus *in utero* as to cause its arrest in whole or in part, and produce its resulting abnormalities?

Can the mother's mind produce the diseases of the uterus or its membranes which result in false bands or placental adhesions, which cause amputation and other deformities?

Can such impression cause the umbilical cord to encircle and amputate a limb or cause the death of the foetus?

Can such impression reach or act on the newly impregnated ovum so as to cause the double cicatrix to approach each other so closely as to result in union and double monstrosity?

Is it possible for maternal influence to destroy or deform one foetus *in utero*, while another enclosed in the same membranes is uninjured?

A large per cent of congenital deformities being shown to arise from local and other causes, which can have no connection with maternal influence, is it probable that at another time exactly the same deformity is produced by maternal impressions?

Is it reasonable that an intra-uterine amputation will be caused in one case by an amniotic band, while in another it may be caused by maternal impressions?

When it is remembered that no nervous connection exists between the embryo and the mother; that there is no direct blood communication; that the mother's mind can have no influence in causing the pathological states which have been shown to be the cause of the malformation; that during the first weeks of foetal life the ovum is surrounded by anatomical conditions precluding maternal influence, whereas it has been shown that the vast majority of malformations have their origin in that period of embryonic life in which the ovum is still homogeneous blastema; when all these facts are remembered, it cannot be believed that the mother's mind can change the conformation of the foetus *in utero*.

All modern authors who advocate the affirmative view of this question (Hammond, Dalton, Tuke and others) admit the impossibility of such effect obtaining except through the medium of the blood. Dr. Hammond says the whole matter rests, therefore, on the question as to whether the blood can undergo change through the influence of the mind, and can serve as a means for the transmission of mental impressions. "That it can be so altered, and that it is a medium for communication between the brain of the mother and the foetus, is sufficiently proved by the records of physiological science as already quoted." The records referred to consist of a statement in the preceding paragraph "that through the blood of the foetus the mother may be so impressed with the

attributes of the father as to transmit them to future offspring." In support of this theory is mentioned (without any history) the case of a mare which had a foal by a quagga, and afterwards had four colts all marked like the quagga. He further says: "It is not uncommon to see children of a widow by her second husband resemble in mind and body her first husband, provided she had children by him;" also, through this influence "it is often the case that the mother comes in time to resemble the father in mental and physical characteristics. Now, how is this effect produced but through the blood of the fœtus coming in intimate relation to that of the mother? The offspring has received certain physical or mental impressions from the father, it conveys them, through its blood, to the blood of the mother, and the latter, in turn, gives them, through her blood, to a subsequent fœtus in her womb. The blood serves as a medium of communication throughout—there is no nervous connection whatever. If through her blood she can transmit certain bodily marks not on her own body to the body of the offspring, why may she not, through the same medium, impart other peculiarities which have produced a powerful impression on her mind."

We have given these views at length to show how far-fetched are the arguments necessary to sustain such a proposition. We believe this to be reasoning from false premises.

1. Where is the evidence that "the blood can undergo change through the influence of the mind, or can serve as a medium for the transmission of mental impressions?"

2. It is not known, neither is there good evidence that the father can through the fœtus give the mother "his mental and physical characteristics."

3. It would seriously conflict with well founded physiological facts to believe that the blood of the mother, which is constantly undergoing change, could retain the impress of the father (given through the medium of the fœtus) for years, and then "transmit certain bodily marks not on her own body to the body of her (next) offspring."

Dr. Dalton's explanation of foetal abnormality might be termed a mechanical theory, and has at least the merit of simplicity.

“If a nervous shock may excite premature contraction of the muscular fibres of a pregnant uterus and produce abortion, it is certainly capable of disturbing the course of the circulation through the same organ.” This is the basis of his etiology, yet he nowhere explains how such a condition of the circulation in the uterus could at one time cause arrested development of an arm, at another a leg, or at another time a failure of closure of the abdominal plates. Again, by his own interpretation, it destroys all relation between the character of the mental impression and the deformity which would follow.

But by far the greatest objection to such a theory is found in the now well established physiological fact, that under normal conditions the circulation in the placenta is exceedingly irregular, arising from the anatomical construction of the vessels, which have their analogue in the cavernous bodies of the penis—“arteries of entrance, veins of exit, and intervening lacunæ.”—*Whitaker*.

But Providence has not left the development of the human fœtus “to the influence of maternal whims and caprices—to an imitative metamorphic power which would result in fœtal reproductions of every object which impresses the maternal mind with disgust and horror.”

Indeed, we cannot but admire the provisions which have been made to shield it from such influences. Up to the third month its attachment to the mother is far from being intimate, being sustained by imbibition of an albuminous secretion through the walls of the chorion villi, first during its passage along the fallopian tube, and afterward from the mucous membrane of the uterus, by which it is encapsuled. Very recent investigations have shown that even as late as the second month the ovum is loosely attached to the uterine deciduâ.

It certainly is not reasonable that the mother can influence the fœtus at such a time and under such anatomical conditions. And yet modern experimental embryology, above quoted, proves that the causes of fœtal abnormalities have their origin in that period of embryonic life while the embryo is still homogeneous blastema.

After the formation of the placenta these protective conditions

still obtain, for the vessels of the cord and placenta have no vasomotor nerves, thus effectually shutting off the injurious influences of the mental perturbations of the mother, which might otherwise act injuriously on the foetus.

Facts are also strongly confirmatory of this theoretical reasoning, as instance the great frequency of mental impressions of the mother; and the rarity of any sort of deformity.

Dr. Fisher, who has made it a rule to inquire of women regarding their apprehensions of deformity of their offspring *previous to confinement*, found the larger number of 1,200 cases expressed their fear of such a result, and frequently specified the circumstances and the nature of the deformity. And yet only three cases of any sort of deformity occurred in the entire number, and these could in no way verify the mother's predictions. He justly adds that "all the countless longings of these sixty score and more of pregnant women, their excited imaginations, their shocks from objects of disgust and terror, all the hare lips, the wounds, the armless or legless men they saw, the cats and dogs or other beasts they encountered, were powerless to produce a single case of malformation."—*Am. Jour. of Insanity, January, 1870.*"

William Hunter, the justly celebrated author of "The Anatomy of the Gravid Uterus," made inquiry of 2,000 cases. "In no case did a single coincidence of mental emotion and a corresponding abnormal development occur in all his observations."

But it is to comparative embryology that we must look for the most conclusive evidence, for it is now settled by indisputable proofs that every known form of monstrosity found in the human race has its analogue and even occurs more frequently in the lower animals, birds, fishes and reptiles. Now, if we ascribe such abnormalities in the lower animals to impressions made on the brain of the mother, the argument here ceases. For we know it matters little whether the hen hatches her own eggs, or a duck, goose, dog, cat, or even artificial heat, perform the same office. Chickens will always be the result.

Again, in the case of the eggs of fish, embryonic development goes on without any reference to the female which deposited them, provided the required heat, light, etc., be acting. And in both

the eggs of fish and fowl thus incubated are developed all of the known types of monstrous formation occurring in man.

If such deviations from the normal states obtain in fish and fowl under circumstances precluding maternal influences, how is it possible to ascribe them to such influences when occurring in the human race?

